



CLIENT IDNR
 PROJECT NAME Site 2295
 PROJECT LOCATION Booneville, Indiana

BORING # BH-1
 Northing 1022062.791
 Easting 2905710.665
 JOB # 170DR00045

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 4/4/17 Hammer Wt. 140 lbs.
 Date Completed 4/4/17 Hammer Drop 30 in.
 Drill Foreman Gary Lauber Spoon Sampler OD 2 in.
 Inspector Rock Core Dia. 1.875 in.
 Boring Method HSA/RC Shelby Tube OD in.

SOIL CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFACE ELEVATION 421.545										
Topsoil with gravel - 1ft	420.5	1.0								
SILTY CLAY, brown, moist			5					▼		
			10							
SILTY CLAY, dark brown and brown, mottled with black, plastic, slightly sticky, moist, non-effervescent, trace gravel	410.5	11.0		1	SS	☒	■		3-6-9	
	405.0	16.5								
CLAY, light gray, mottled with brown, plastic, sticky, slightly moist, non-effervescent	401.9	19.6		2	SS	☒	■		2-3-14	
SHALE, sandy, brown, soft	399.5	22.0								
SHALE, gray, highly broken	396.2	25.3		3	SS	☒	■		50/5	
SHALE, dark gray, soft, unweathered			25	1	RC	■	■			RC #1 from 25.3 ft to 26.3 ft; RQD=0%
				2	RC	■	■			RC #2 from 26.3 ft to 31.3 ft; Rec.=100%; RQD=60%
	390.2	31.3	30							
SHALE, dark gray, soft and very soft, weathered, highly broken	388.2	33.3		3	RC	■	■			RC #3 from 31.3 ft to 36.3 ft; Rec.=98%; RQD=0%
SHALE, dark gray, unweathered, moderately broken			35							
- decomposed at 35.5 ft			40	4	RC	■	■			RC #4 from 36.3 ft to 41.3 ft; Rec.=96%; RQD=16%
Bottom of Boring at 41.3 ft	380.2	41.3								Grouted boring at completion.

Sample Type
 SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Depth to Groundwater
 ● Noted on Drilling Tools _____ ft.
 ∇ At Completion _____ ft.
 ▼ After 12 hours 2.5 ft.
 ☒ Cave Depth _____ ft.

Boring Method
 HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling
 HA - Hand Auger



CLIENT **IDNR**
 PROJECT NAME **Site 2295**
 PROJECT LOCATION **Booneville, Indiana**

BORING # **BH-2**
 Northing **1022944.983**
 Easting **2905746.104**
 JOB # **170DR00045**

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started **4/4/17** Hammer Wt. **140** lbs.
 Date Completed **4/4/17** Hammer Drop **30** in.
 Drill Foreman **Gary Lauber** Spoon Sampler OD **2** in.
 Inspector Rock Core Dia. **1.875** in.
 Boring Method **HSA/RC** Shelby Tube OD in.

SOIL CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFACE ELEVATION 450.083										
Topsoil - 3"	449.9	0.2								
CLAY, brown and mottled with dark brown, stiff, slightly plastic, slightly sticky, slightly moist, non-effervescent, trace gravel	445.6	4.5		1	SS	X			3-4-8	
	444.1	6.0	5	2	SS	X			3-5-6	
SILTY CLAY, brown with black, stiff, plastic, slightly sticky, slightly moist				3	SS	X			5-20-23	
SHALE, dark brown and blackish brown, weathered, fissile, dry	439.6	10.5	10	4	SS	X			8-50/.5	
- light gray and sandy from 9 ft				5	SS	X			35-50/.3	
SHALE, gray, decomposed, dry				6	SS	X			28-50/.2	
				7	SS	X			25-50/.3	
	429.9	20.2	20	8	SS	X			40-50/.3	
SHALE, gray, unweathered, soft and moderately hard, with calcareous and fossiliferous sections	425.5	24.6	25	1	RC					RC #1 from 20.2 ft to 21.4 ft; Rec.=83%; RQD=33%
				2	RC					RC #2 from 21.4 ft to 26.4 ft; Rec.=100%; RQD=40%
SHALE, dark gray, soft, highly broken				3	RC					RC #3 from 26.4 ft to 31.4 ft; Rec.=34%; RQD=0%
	419.1	31.0	30	4	RC					RC #4 from 31.4 ft to 36.4 ft; Rec.=100%; RQD=52%
SHALE, gray, soft - dolomite from 31.2 ft to 34.2 with dark gray sandy clay seam from 33.5 ft to 33.8 ft	415.9	34.2	35	5	RC					RC #5 from 36.4 ft to 41.4 ft; Rec.=100%; RQD=64%
SHALE, dark gray, unweathered, moderately hard, fossiliferous at 38.4 ft	410.5	39.6	40	6	RC					RC # 6 from 41.4 ft to 46.4 ft; Rec.=100%; RQD=8%
COAL, black, with pyrite				7	RC					RC #7 from 46.4 ft to 49.4 ft; Rec.=93%; RQD=60%
	402.8	47.3	45							
UNDERCLAY, light gray, sandy	402.3	47.8								
	400.7	49.4								

Sample Type
 SS - Driven Split Spoon
 ST - Pressed Shelby Tube
 CA - Continuous Flight Auger
 RC - Rock Core
 CU - Cuttings
 CT - Continuous Tube

Depth to Groundwater
 ● Noted on Drilling Tools _____ ft.
 ∇ At Completion **Ground level** _____ ft.
 ▼ After _____ hours _____ ft.
 ⊠ Cave Depth _____ ft.

Boring Method
 HSA - Hollow Stem Augers
 CFA - Continuous Flight Augers
 DC - Driving Casing
 MD - Mud Drilling
 HA - Hand Auger



CLIENT IDNR
 PROJECT NAME Site 2295
 PROJECT LOCATION Booneville, Indiana

BORING # BH-3
 Northing 1023499.566
 Easting 2905761.91
 JOB # 170DR00045

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 4/5/17 Hammer Wt. lbs.
 Date Completed 4/5/17 Hammer Drop in.
 Drill Foreman Gary Lauber Spoon Sampler OD in.
 Inspector Rock Core Dia. 1.875 in.
 Boring Method HSA/RC Shelby Tube OD in.

SOIL CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFACE ELEVATION 469.313										
SILTY CLAY, brown, moist										Soils classified based on visual observations during drilling operations.
SAND, with silt and clay, orange brown	463.3	6.0	5							
SHALE, sandy, black, soft	457.3	12.0	10							
SHALE, gray, weathered	454.3	15.0	15							
			20							
SHALE, dark gray, unweathered, soft, with moderately hard, calcareous and fossiliferous sections	443.8	25.5	25							
			30	1	RC					
				2	RC					
SHALE, dark gray, unweathered, soft	432.8	36.5	35							
			40	3	RC					
SHALE, black, soft	426.1	43.2	40							
			45	4	RC					
SHALE, dark gray, moderately hard, calcareous	423.7	45.6	45							
	423.1	46.2								
	422.1	47.2		5	RC					
SHALE, black, unweathered										

RC #1 from 30.5 ft to 31.7 ft; Rec.=92%; RQD=33%
 RC #2 from 31.7 ft to 36.7 ft; Rec.=100%; RQD=90%
 RC #3 from 36.7 ft to 41.7 ft; Rec.=92%; RQD=52%
 RC #4 from 41.7 ft to 46.7 ft; Rec.=96%; RQD=56%
 RC #5 from 46.7 ft to 51.7 ft; Rec.=100%; RQD=40%

Sample Type

Depth to Groundwater

Boring Method

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

- Noted on Drilling Tools ft.
- ∇ At Completion 4.8 ft.
- ▼ After hours ft.
- ⊠ Cave Depth ft.

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling
- HA - Hand Auger



CLIENT IDNR BORING # BH-3
PROJECT NAME Site 2295 Northing 1023499.566
PROJECT LOCATION Booneville, Indiana Easting 2905761.91
JOB # 170DR00045

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 4/5/17 Hammer Wt. lbs.
Date Completed 4/5/17 Hammer Drop in.
Drill Foreman Gary Lauber Spoon Sampler OD in.
Inspector Rock Core Dia. 1.875 in.
Boring Method HSA/RC Shelby Tube OD in.

SOIL CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
(continued)										
COAL, black, with pyrite	415.5	53.8		6	RC					RC #6 from 51.7 to 56.7 ft; Rec.=100%; RQD=76% Grouted boring at completion.
UNDERCLAY, light gray	414.9	54.4	55							
SILTSTONE, light gray, unweathered, moderately hard	412.6	56.7								
Bottom of Boring at 56.7 ft										

Sample Type

Depth to Groundwater

Boring Method

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

- Noted on Drilling Tools ft.
- ▽ At Completion 4.8 ft.
- ▼ After hours ft.
- ☒ Cave Depth ft.

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling
- HA - Hand Auger



CLIENT IDNR
 PROJECT NAME Site 2295
 PROJECT LOCATION Booneville, Indiana

BORING # BH-6
 Northing 1022994.25
 Easting 2906209.244
 JOB # 170DR00045

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 4/3/17 Hammer Wt. lbs.
 Date Completed 4/3/17 Hammer Drop in.
 Drill Foreman Gary Lauber Spoon Sampler OD in.
 Inspector Rock Core Dia. 1.875 in.
 Boring Method HSA/RC Shelby Tube OD in.

SOIL CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks	
SURFACE ELEVATION 457.058											
Topsoil - 4"	456.8	0.3								Soils classified based on visual observations during drilling operations.	
SILTY CLAY, brown			5								
			10								
	445.1	12.0									
SILTY CLAY, dark brown	443.6	13.5									
SHALE, dark brown and gray, highly to moderately weathered, fissile, soft, with siltstone seams, decomposed from 24 ft			15	1	RC						RC #1 from 15.2 ft to 16.3 ft; Rec.=100%; RQD=0%
				2	RC						
			20								
			25	3	RC						RC #3 from 21.3 ft to 26.3 ft; Rec.=90%; RQD=0%
SHALE, dark gray, slightly weathered	432.0	25.1									
			30								
SHALE, gray, unweathered, calcareous	427.5	29.6								RC #4 from 26.3 ft to 31.3 ft; Rec.=98%; RQD=68%	
SHALE, gray, unweathered	425.8	31.3									
SHALE, dark gray, moderately weathered, soft, moderately hard at calcareous lamination	424.6	32.5		5	RC					RC #5 from 31.3 ft to 36.3 ft; Rec.=100%; RQD=32%	
			35								
			40								
SHALE, gray, unweathered, moderately hard, calcareous	416.3	40.8								RC #6 from 36.3 ft to 41.3 ft; Rec.=78%; RQD=20%	
SHALE, black, unweathered	415.8	41.3		7	RC						
			45								
COAL, black, broken	410.6	46.5		8	RC					RC #7 from 41.3 ft to 46.3 ft; Rec.=118%; RQD=54%; Recovered 0.9 ft from previous RC	
										RC #8 from 46.3 ft to 51.3 ft; Rec.=100%; RQD=0%	

Sample Type

Depth to Groundwater

Boring Method

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

- Noted on Drilling Tools ft.
- ∇ At Completion 9.3 ft.
- ▼ After hours ft.
- ⊠ Cave Depth ft.

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling
- HA - Hand Auger



CLIENT IDNR
 PROJECT NAME Site 2295
 PROJECT LOCATION Booneville, Indiana

BORING # BH-8
 Northing 1022590.088
 Easting 2906728.027
 JOB # 170DR00045

DRILLING and SAMPLING INFORMATION

TEST DATA

Date Started 3/28/17 Hammer Wt. lbs.
 Date Completed 3/28/17 Hammer Drop in.
 Drill Foreman Gary Lauber Spoon Sampler OD in.
 Inspector Rock Core Dia. 1.875 in.
 Boring Method HSA/RC Shelby Tube OD in.

SOIL CLASSIFICATION	Stratum Elevation, ft	Stratum Depth, ft	Depth Scale, ft	Sample No.	Sample Type	Sampler Graphics	Recovery Graphics	Groundwater	Standard Penetration Test, Blows per 6 in. Increments	Remarks
SURFACE ELEVATION 441.418										
SILTY CLAY, brown, moist, with rock fragments			5							Soils classified based on visual observations during drilling operations.
	434.4	7.0								
SILTY CLAY, brown, slightly moist, with rock fragments	431.0	10.4	10							RC #1 from 10.4 ft to 15.9 ft; Rec.=63%; RQD=49%
LIMESTONE, dark gray, unweathered, hard	430.5	10.9		1	RC					
SHALE, brown and gray, moderately weathered, soft - limesone lamination at 12.2 ft			15							RC #2 from 15.9 ft to 20.9 ft; Rec.=98%; RQD=50%
SHALE, dark gray, unweathered, calcareous	425.4	16.0		2	RC					
SHALE, dark gray, soft with fragments of limestone - limestone lamination from 20.6 ft to 20.9 ft			20							RC #3 from 20.9 ft to 25.9 ft; Rec.=80%; RQD=34%
calcareous shale from 23 ft to 24 ft	417.4	24.0		3	RC					
SHALE, black, moderately hard, highly broken, limestone lamination at 26.6 ft	414.0	27.4	25							RC #4 from 25.9 ft to 30.9 ft; Rec.=98%; RQD=34%
LIMESTONE, dark beige gray, unweathered, moderately hard	413.3	28.1		4	RC					
SHALE, black, unweathered	411.3	30.1	30							RC #5 from 30.9 ft to 35.9 ft; Rec.=96%; RQD=0%
COAL, black, broken, with pyrite				5	RC					
	405.8	35.6	35							RC #6 from 35.9 ft to 40.9 ft; Rec.=98%; RQD=98%
UNDERCLAY, gray, soft	405.0	36.4		6	RC					
SILTSTONE, light gray, unweathered, unfractured, thinly laminated			40							Grouted boring at completion.
Bottom of Boring at 40.9 ft	400.5	40.9								

Sample Type

Depth to Groundwater

Boring Method

- SS - Driven Split Spoon
- ST - Pressed Shelby Tube
- CA - Continuous Flight Auger
- RC - Rock Core
- CU - Cuttings
- CT - Continuous Tube

- Noted on Drilling Tools ft.
- ∇ At Completion 23.8 ft.
- ▼ After 14 hours 24.4 ft.
- ⊠ Cave Depth ft.

- HSA - Hollow Stem Augers
- CFA - Continuous Flight Augers
- DC - Driving Casing
- MD - Mud Drilling
- HA - Hand Auger